

## **CLAIMS**

1. A bioreactor method of processing a fluent biomass delivered to a tank under different conditions, involving either direct discharge of a waste sludge or withdrawal of a cleansed effluent by membrane filtration, the improvement residing in the steps of: internally dividing the tank into a volumetrically large chamber within which the fluent biomass is biologically treated and a volumetrically small chamber within which membrane filtration is performed; lowering contamination of a separated portion of the biologically treated fluent biomass recycled from the large chamber into the small chamber to undergo said membrane filtration therein; and withdrawing from the small chamber said portion of the wastewater after undergoing said membrane filtration as the cleansed effluent.
2. The method as defined in claim 1, wherein said step of lowering the contamination is performed outside the tank by centrifugation.
3. The method as defined in claim 2, wherein said step of withdrawing the cleansed effluent is interrupted under selective control, while the waste sludge is undergoing said direct discharge in by-pass relation to the small chamber.
4. The method as defined in claim 1, wherein said step of withdrawing the cleansed effluent is interrupted under selective control, while the waste sludge is undergoing said direct discharge in by-pass relation to the small chamber.

5. The method as defined in claim 4, wherein the fluent biomass is wastewater having bacteria and a concentration of solids therein establishing said contamination that is lowered within said portion thereof undergoing said membrane filtration.
6. A bioreactor system for biological treatment and membrane filtration of a biomass within a tank, the improvement residing in: means for internally partitioning the tank into volumetrically small and large chambers; positioning means for confining said filtration to the small chamber; means for separating the biomass into portions respectively having increased and lowered concentration of solids therein after undergoing said biological treatment within the large chamber; and recycling means for respective delivery of said separated portions of the biologically treated biomass into the small chamber to undergo said filtration and into the large chamber to undergo biological retreatment.
7. The bioreactor system as defined in claim 6, including selective control means for disposal of one of the separated portions of the biologically treated biomass by direct discharge in by-pass relation to the tank while interrupting said delivery thereof into the small chamber by operational isolation to prevent said filtration.
8. The bioreactor system as defined in claim 7, wherein said means for separating comprises: a centrifuge dewatering device interconnecting the tank and the recycling means externally of the tank; and transfer pump means for supply of the biologically treated biomass from the large chamber of the tank under pressure to the dewatering device.

9. The bioreactor system as defined in claim 8, wherein said one of the separated portions of the biomass having the lowered concentration of solids undergoes said filtration within the small chamber of the tank, while the other of said portions is recycled into the large chamber.
10. The bioreactor system as defined in claim 6, wherein the biomass is wastewater contaminated by said concentration of solids therein.
11. The bioreactor system as defined in claim 6, wherein said means for separating the wastewater into the portions comprises: a centrifuge dewatering device connected to the recycling means externally of the tank; and transfer pump means for supply of the biologically treated biomass from the large chamber of the tank under pressure to the dewatering device.
12. The bioreactor system as defined in claim 6, wherein said one of the separated portions of the biomass undergoing said filtration within the small chamber of the tank has said lowered concentration of solids therein, while the other of said portions recycled into the large chamber has the increased concentration of solids therein.
13. A bioreactor system within which wastewater having contamination therein is processed, comprising: a tank within which the wastewater is collected; partitioning means for internally dividing the tank into volumetrically smaller and larger chambers; means for continuous biological treatment of the collected wastewater within the larger chamber during operation of the bioreactor system; means for recycling the collected wastewater between the chambers during said biological treatment thereof; membrane means for performance of filtration during said

recycling of the collected wastewater within the tank; dewatering means located outside the tank for separation of the wastewater into a portion with the contamination increased and continuously returned to the tank and a portion with the contamination lowered; said membrane means being positioned inside the smaller chamber of the tank within which the wastewater undergoes said filtration into a cleansed effluent withdrawn from the bioreactor system; said means for recycling of the wastewater involving: continuous overflow of the wastewater within the tank from the smaller chamber into the larger chamber, and passage into the smaller chamber from the larger chamber through the dewatering means from which the portion with the lowered contamination undergoes delivery into the smaller chamber or disposal in by-pass relation thereto; and selectively controlled valve means for interrupting either said delivery into the smaller chamber or said disposal from the bioreactor system.

14. A bioreactor system through which wastewater with contamination therein is processed, comprising: a tank internally divided into volumetrically large and small chambers; means for biologically treating the wastewater collected within the large chamber of the tank during operation of the bioreactor system; means for recycling the biologically treated wastewater within the tank, involving overflow of the wastewater between the chambers inside the tank and passage thereof between the chambers outside the tank; dewatering means located outside the tank for separation of the biologically treated wastewater undergoing said recycling passage outside the tank into portions having the contamination therein respectively increased and lowered; conduit means located outside the tank for continuous return of one of the separated portions of the biologically treated wastewater with the increased contamination from the dewatering means into the tank; membrane means for filtration of the other of the separated portions of the wastewater

into a cleansed effluent; and selectively controlled valve means for either interrupting delivery of the separated portion of the wastewater with the lowered contamination into the small chamber or disposal thereof by direct discharge from the dewatering means in by-pass relation to the tank when said delivery to the small chamber is interrupted.

15. The bioreactor system as defined in claim 14, wherein said overflow of the wastewater inside the tank enters the large chamber maintained at a lower surface level; the membrane means being located inside the small chamber of the tank so that the separated portion of the wastewater with the lowered contamination from the dewatering means undergoes said filtration by the membrane means into the cleansed effluent to be withdrawn from the small chamber while said conduit means continuously returns said one of the separated portions of the wastewater with the increased contamination to the large chamber.